Andrew Neil Smith

Mechanical Engineering Department
United States Naval Academy
590 Holloway Road
Annapolis, MD 21402-5042
(410) 293-6539
Fax (410) 293-3041
ansmith@usna.edu

Education:

University of Virginia Jan. 96 - May 01
Department of Mechanical and Aerospace Engineering
Doctor of Philosophy, Mechanical and Aerospace Engineering
Dissertation Topic: "Electron Phonon Nonequilibrium During Ultrashort Pulsed Laser Heating"
Advisor: Dr. Pamela M. Norris

Villanova University, *Magna Cum Laude* Sept. 88 - May 92
Bachelors of Science, Mechanical Engineering

Employment:

United States Naval Academy, Annapolis, MD Aug. 01 - Present
Assistant Professor, Mechanical Engineering

Primary duties include instruction and development of undergraduate courses in Thermodynamics, Heat Transfer and Fluid Mechanics. Research areas include focused on microscale heat transfer, advanced energy systems, and ultrafast laser heating for diagnostic applications and laser micromachining.

University of Virginia Jan. 96 – July 01
Graduate Research Assistant, Department of Mechanical and Aerospace Engineering

Ph.D. candidate conducting research in Microscale Heat Transfer. Research topics include: ultrashort pulse laser heating, nonequilibrium heating, and transient thermoreflectance techniques used for thermal diffusivity and thermal boundary resistance measurements on thin metallic films.

University of Virginia Sept. 99 - Dec. 99
Teaching Intern, Department of Mechanical and Aerospace Engineering

Co-Instructed Thermal Systems Analysis, ME 323, as a Doctoral Teaching Fellow. Shared equal responsibilities with the professor for all aspects of the course, including lecturing, grading, and test preparation.

University of Virginia Jan. 96 - May 97
Graduate Teaching Assistant, Department of Mechanical and Aerospace Engineering

Assisted in the instruction of undergraduate courses in Thermodynamics and Heat Transfer. Held discussion sections and office hours for both courses. Participated in the development and implementation of software that was integrated into a virtual lab for the Heat Transfer course. Co-Instructed the computer laboratory for three consecutive course offerings.

United States Naval Support Facility, Antigua, W.I. Dec. 94 - Dec. 95
Public Works Officer

Responsible for the maintenance and operation of all base facilities, including 84 buildings, 108 acres of land, and all utilities systems. Additional duties included Environmental Officer, Safety Officer, and Command Duty Officer. Personally managed 22 military and 30 civilian employees.

United States Naval Academy, Annapolis, MD May 92 - Dec. 94
Project Engineer

Managed active construction contracts valued at over $20M including a new $6M Visitor's Center. Responsible for assuring that all work was performed properly, resolving all design changes, and coordinating all work with the customers in order to minimize operational impact.

National Institute of Standards and Technology May 89 - Sept. 91
Engineering Technician (summer employment)

Worked in the Automated Production and Technology Division. Responsibilities included the design of minor components, programming statistical software, and programming the interface between a PC and an automated lathe**.**

Awards:

Recipient of National Defense Science and Engineering Graduate Fellowship
Ballard Leadership Award, University of Virginia
Navy and Marine Corps Commendation Medal
Navy and Marine Corps Achievement Medal
Dean's Award for Academic Excellence, Villanova University
SAME, Philadelphia Post Scholarship
PHI KAPPA PHI Honor Society Member

Research Interests:

Microscale Heat Transfer
Ultrashort Pulsed Laser Heating
Nonequilibrium Thermal Transport
Interfacial Thermal Transport

Book Chapter:

A. N. Smith and P. M. Norris, Microscale Heat Transfer, to appear in the Handbook of Heat Transfer, John Wiley & Sons, Inc.

Journal Publications:

A.N. Smith and P.M. Norris, "Influence of Intraband Transitions on the Electron Thermoreflectance Response of Metals." *Applied Physics Letters*, Vol. 78, pp. 1240-1242, 2001

A.N. Smith, J.L. Hostetler, and P.M. Norris, "Thermal Boundary Resistance Measurements using a Transient Thermoreflectance Technique." *Microscale Thermophysical Engineering*, Vol. 4, pp. 25-38, 2000.

J.L. Hostetler, A.N. Smith, and P.M. Norris, "Interpretation of Femtosecond Thermoreflectance Data in the Presence of Interband Transitions and Nonequilibrium Heating." *Thermal Science & Engineering*, Vol. 7, pp. 61-68, 1999.

A.N. Smith, J.L. Hostetler, and P.M. Norris, "Nonequilibrium Heating in Thin Films: an Analytical and Numerical Analysis." *Numerical Heat Transfer A*, Vol. 35, pp. 859-874, 1999.

J.L. Hostetler, A.N. Smith, D.M. Czajikowsky, and P.M. Norris, "Measurement of the Electron-Phonon Coupling Factor Dependence on Film Thickness and Grainsize in Au, Cr, and Al." *Applied Optics*, Vol. 38, pp. 3614-3620, 1999. Also, *Proceedings of Eurotherm Seminar No 57: Microscale Heat Transfer*, UMR CNRS No. 6608,pp. 265-275, 1998.

J.F.T. Conroy, B. Hosticka, S.C. Davis, A.N. Smith, and P.M. Norris, "Microscale Thermal Relaxation during Acoustic Propagation in Aerogel and Other Porous Media." *Microscale Thermophysical Engineering*, Vol. 3, pp. 199-215, 1999.

A.N. Smith and P.M. Norris, "Numerical Solution for the Diffusion of High Intensity, Ultrashort Laser Pulses within Metal Films." *Proceedings of the 1998 International Heat Transfer Conference*, Vol. 5, pp. 241-246, 1998. (Reviewed as archival journal publication with 54% acceptance rate.)

J.L. Hostetler, A.N. Smith, and P.M. Norris, "Simultaneous Thermophysical and Mechanical Property Measurements of Thin Films." *International Journal of Thermophysics*, Vol. 19, pp. 569-577, 1998. Also, *Proceedings of the 13th Symposium on Thermophysical Properties,* Boulder, CO, June 1997.

J.L. Hostetler, A.N. Smith, and P.M. Norris, "Thin Film Thermal Conductivity and Thickness Measurements Using Picosecond Ultrasonics." *Microscale Thermophysical Engineering*, Vol. 1, pp. 237-244, 1997.

Conference Publications:

(not appearing previously)

A. N. Smith, A. P. Caffrey, J. M. Klopf, and P. M. Norris, "Importance of Signal Phase on the Transient Thermoreflectance Response as a Thermal Sensor." *Proceedings of the National Heat Transfer Conference*, Anaheim, CA, June 2001.

A.N. Smith, J.L. Hostetler, and P.M. Norris, "Effect of Intraband Transitions on Transient Thermoreflectance Response of Metals." *Proceedings of the 2000 National Heat Transfer Conference*, NHTC2000-12258, Pittsburgh, PA.

A.N. Smith, J.L. Hostetler, and P.M. Norris, "Measurement of Thermal Boundary Resistance between Thin Metal Films and Dielectric Substrates." *Proceedings of Eurotherm Seminar No 57: Microscale Heat Transfer*, UMR CNRS No. 6608, pp. 277-284, 1998.

A.N. Smith, A.S. Lee, and P.M. Norris, "Theoretical Determination of Laser Damage Threshold Value for Ultrashort Pulse Laser Heating of Thin Metal Films." *Proceedings of the 1997 International Mechanical Engineering Congress & Exposition*, HTD-Vol. 354, pp. 161-169, 1997.

R.E. Barnard, A.N. Smith, and P.M. Norris, "Optical Coating Design using Parabolic Heat Conduction Models*." Proceedings of the 1997 National Heat Transfer Conference*, HTD-Vol. 344, pp. 111-116, 1997.

P.M. Norris, R.J. Ribando, G.W. O'Leary, T.C. Scott, and A.N. Smith, "Integration of the Virtual Lab into the Undergraduate Heat Transfer Curriculum*." Proceedings of ICEE '97*, pp. 172-178, 1997.

R.J. Ribando, P.M. Norris, T.C. Scott, G.W. O'Leary, and A.N. Smith, "A Partial Studio Model for Teaching Undergraduate Heat Transfer." *Proceedings of the 1996 Frontiers in Education Conference*, Salt Lake City, UT, 1996.

Presentations:

"Importance of Signal Phase on the Transient Thermoreflectance Response as a Thermal Sensor." Presented at the 2001 National Heat Transfer Conference, Anaheim, CA, June 12, 2001.

"Effect of Intraband Transitions on the Transient Thermoreflectance Response of Metals." Presented at the 2000 National Heat Transfer Conference, Pittsburgh, PA, August 21, 2000.

"Measuring the Electron-Phonon Coupling Factor of Thin Metal Films Using the Femtosecond Transient Thermoreflectance Technique." Presented at the Naval Research Laboratory, June 28, 2000.

"Interpretation of Nonequilibrium Transient Thermoreflectance Data." Presented at Symposium, Technology for the Next Century, Polytechnic University, November 5, 1999.

"Numerical Solution for the Diffusion of High Intensity, Ultrashort Laser Pulses within Metal Films." Presented at 11^{th} International Heat Transfer Conference, Kyongju, Korea, August 28, 1998.

"Measurement of Thermal Boundary Resistance between Thin Metal Films and Dielectric Substrates." Presented at Eurotherm Seminar No 57: Microscale Heat Transfer, Poiters, France, July 10, 1998.

"Theoretical Determination of Laser Damage Threshold Value for Ultrashort Pulse Laser Heating of Thin Metal Films." Presented at 1997 IMECE, Dallas, TX, November 20,1997.